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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,704	08/28/2003	Yoshiaki Fukuzumi	241998US2S	6772
22850	7590	09/30/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			HO, TU TU V	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 09/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/649,704

Applicant(s)

FUKUZUMI, YOSHIAKI

Examiner

Tu-Tu Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) 3,4,12,13,20,21,25 and 27-52 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-11,14-19,22-24 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/28/2003
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 01/16/2004 is acceptable.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Election/ Restriction

3. Applicant's election without traverse of Species IA, Illustrated in Figures 1A and 1B or 15A and 15B, of Invention I, in the reply filed on 09/20/2004 is acknowledged. Applicant further identified claims 1-26 as readable on the elected species. However, claims 3-4, 12-13, 20-21, and 25 are not readable on the elected species, Claims 3, 12, and 20, and claims 4, 13, 21, and 25 are readable on Species IB and IC respectively.
4. Claims 32-52 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, and claims 3-4, 12-13, 20-21, 25, and 27-31 to nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 09/20/2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-2, 5-11, 14-19, 22-24, and 26** are rejected under 35 U.S.C. 102(e) as being anticipated by Costrini et al. U.S. Patent Application Publication 2004/0063223 (hereinafter referred to as the '223 publication).

The '223 publication discloses in Figures 1-8 and respective portions of the specification a semiconductor memory device as claimed.

Referring to **independent claim 1**, the '223 publication discloses a semiconductor memory device comprising:

a memory cell comprising a first ferromagnetic film (110, Fig. 2B and 5), a tunnel barrier film (115) formed on the first ferromagnetic film, and a second ferromagnetic film (120) formed on the tunnel barrier film;

a side wall insulating film (82) formed so as to surround at least sides of the second ferromagnetic film; and

an interlayer insulating film (86, Fig. 6) formed so as to cover the memory cell and the side wall insulating film.

Referring to **independent claim 10** and using the same reference characters and citations as detailed above for claim 1, the '223 publication discloses a semiconductor memory device comprising:

a memory cell comprising a first ferromagnetic film, a tunnel barrier film formed on the first ferromagnetic film, and a second ferromagnetic film formed on the tunnel barrier film; and
a side wall insulating film (82, from layer 72 of Al₂O₃, paragraph [0020]) formed so as to surround at least sides of the second ferromagnetic film and containing a metal element (Al).

Referring to **independent claim 19** and using the same reference characters and citations as detailed above for claim 1, the '223 publication discloses a semiconductor memory device comprising:

a memory cell comprising a first ferromagnetic film, a tunnel barrier film formed on the first ferromagnetic film, and a second ferromagnetic film formed on the tunnel barrier film; and
a side wall insulating film (82) formed on the tunnel barrier film (115) so as to surround a periphery of the second ferromagnetic film (120) (paragraph [0017] or claim 2 of the '223 publication, for the etching step ("The ferromagnetic freelay 120 is etched, stopping on the tunnel layer 115...") and paragraph [0020], for forming side wall spacer 82).

Referring to **claims 2 and 11** and using the same reference characters and citations as detailed above for claim 19, the '223 publication further discloses that the side wall insulating film (82) contacts with the tunnel barrier film (115).

Referring to **claims 5, 14, and 22** and using the same reference characters and citations as detailed above for claim 10, the '223 publication further discloses that the side wall insulating film is formed of aluminum oxide.

Referring to **claims 6, 15, and 23**, the '223 publication further discloses that the side wall insulating film (82, from layer 72 of Al₂O₃, paragraph [0020]) and the tunnel barrier film (115, alumina, paragraph [0011]) contain a common metal element (aluminum of Al₂O₃ and aluminum of alumina).

Referring to **claims 7, 16, and 24** and using the same reference characters and citations as detailed above for claim 6, the '223 publication further discloses that the side wall insulating film and the tunnel barrier film are both formed of aluminum oxide.

Referring to **claims 8 and 17**, the '223 publication further discloses that the side wall insulating film (82) contacts with at least a part of side wall of the tunnel barrier film (115) along a circumferential direction (Fig. 5).

Referring to **claims 9, 18, and 26** and using the same reference characters and citations as detailed above for claim 6, the '223 publication further discloses that the tunnel barrier film is formed of aluminum oxide.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent Application Publication 2002/0146851 by Okazawa et al. discloses a TMR memory element (tunnel magnetoresistive effect memory element comprising NiFe, Al₂O₃, and NiFe) having a sidewall insulating layer that is formed naturally from the materials that constitute the TMR stack during the ion etching process to form the stack.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tu-Tu Ho
September 27, 2004